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<p>(54) Title: <b>TOOTH-BRUSH WITH CONTAINER FOR TOOTH-PASTE</b></p>		
<p style="text-align: right; margin-right: 100px;"><b>SECTION B-B</b></p>		
<p>(57) Abstract</p> <p>The tooth-brush with container for tooth-paste and system for squeezing out tooth-paste contained in the tooth-brush holder with minimum number of parts which are all mounted on or in the body (1), consists of inner piston guide (4) with activation button (2), sliding ring (5) one-way valve cover (8), laminated spring (7), piston (3) and toothpick (6). By turning (2) due to coil on the piston guide (3) the tooth paste in the container is being pressed and through one-way valve made of (7) and (8) the paste is squeezed out on the brushy part of the tooth-brush. When tooth-brush is in use and after its use, the one-way valve prevents the penetration of water and air in the tooth-paste container, thus preventing the development of the unwanted chemical procedures on the tooth-paste itself and contributes to the hygiene of the tooth-brush. The additional protection (10) protects the hairy part of the brush.</p>		

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## TOOTH-BRUSH WITH CONTAINER FOR TOOTH-PASTE

**DESCRIPTION****TECHNICAL FIELD**

The tooth-brush with container for tooth-paste and system for squeezing out tooth-paste in accordance with the International classification of patents, can be classified in the sphere which is dealing with brushes in general A 46 B. More precisely, the class is A 46 B 11/02 and comprises brushes with containers or other means for dosing of tooth-paste, where the tooth-paste is emptied from container under pressure. Beside the mentioned one, the near by classification is B 65 D 83/00 and comprises containers with special ways of emptying their own contents.

**TECHNICAL PROBLEM**

At the present time the hygiene, especially of the oral cavity, is a very estimated problem, especially among the inventors. Various types of devices that contribute to oral hygiene, the tooth-brushes of various types, tooth-showers, electrical brushes etc. are practical means but they are not sufficient to provide the perfect hygiene of the oral cavity. Normally we use different tooth-pastes, gels or powders in conjunction with tooth-brushes of almost all kinds and types.

The technical problem that is solved by our invention is a conjunction of the classical type of tooth-brush with container for tooth-paste in the way to obtain the functional unity, which meets not only the high ergonomic and aesthetic requirements but the one which is far more important - hygienic procedure of bringing the tooth-paste on the tooth-brush itself by using one-way valve, as well as the perfect protection of the brushy part of the tooth-brush. The second advantage is the simple design which reflects in the minimum number of parts, as well as in the elegant solution of showing the level of tooth-paste that is squeezed out.

**BACKGROUND ART**

As to the essence that the invention is dealing with, which is the sphere of the tooth-brush and the spread of the invention, one can expect a large number of patent documents in this field. For instance, the patent application EP612490 is treating the same problem and refers actually to the tooth-brushes with additional tooth-paste container. In case of EP612490, the talk is about holder and head containing the brush which can be separated, while the special attention is neither paid to the squeezing itself of the tooth-paste nor to the supply of the tooth-paste to the tooth-brush.

In the application WO9317936 the issue is the emptying of tooth-paste container by means of piston, while the container itself comprises the tooth-brush which is similar to our patent. The invention exposed in the application WO9317927 is in its essence rather complicated. Besides, the main hygienic problem, the closing of the supply channel at the time when the tooth-paste is not coming out, has not been solved at all, which is the advantage and the novelty of the technical solution offered by us.

## DISCLOSURE OF THE INVENTION

The drawing No. 1 shows the outside appearance of the invention of the new type of tooth-brush with container for tooth-paste and with the system for squeezing out the tooth-paste placed in the holder of the brush (hereinafter referred to as brush). The already mentioned function of the container and the brush itself is united in the way that these two objects become one ergonomic, unseparated unit.

The drawing No. 2 shows the longitudinal crosscut with corresponding views on details of the more important crosscuts. The positions on the drawing No. 2 are:

- (1) the body of the brush itself,
- (2) activation button
- (3) piston for squeezing out the tooth-paste
- (4) piston guide with coil
- (5) sliding ring
- (6) sabre shape toothpick
- (7) laminated spring of one-way valve
- (8) one-way valve cover
- (9) hairs for mechanical rubbing on the "brush" head
- (10) protection for hairy part of the brush
- (11) screw serving for support (4)
- (12) rib on the body (1) supported (11)
- (13) part of the piston in which the filling of tooth-paste is effected

The detail A and the sight A on the drawing 2 show the crosscut of the activation button and the piston guide, and the sight of the activation button and the toothpick closet.

The detail B and the crosscut B on the drawing 2 show the crosscut and the way of sealing on the places of leaning the piston with seal on the wall, as well as the part of piston through which the filling of tooth-paste is performed.

The detail C and the crosscut C on the drawing 2 show the end of the imagined path of piston with screw and the piston guide.

The detail D and the crosscut D on the drawing 2 show the construction of the one-way valve with cover and laminated spring.

The detail E shows the way of leaning the activation button on the piston guide.

The detail F shows the way of leaning the hairy protection on the basic brush body.

The drawing 3 shows the design of brush emphasising appearance and distribution of hairs (detail L), the view E is the view from above on the brush, and the view F is the view from underneath on the brush, the view G is the view from front side, the view H is the view from behind to the end with activation button, the detail K is the detail of the connection of the activation button and the very body of the brush.

The drawing 4 shows the views of the body, which permit better understanding of the construction itself. The view A is the view from above, the view B from underneath, the view C from the front side, and the view D is the view of the internal part of the body itself.

The drawings 5 through 13 show the parts which are the component parts of the brush. The drawing 5 shows the design of the activation button. On the drawing 6 is the sliding ring in both relevant projections. The drawing 7 shows the leaning cover of the one-way valve in two sights. The drawing 8 shows the laminated spring in two sights. On the drawing 9 is the sight of the piston guide with relevant views, while the piston itself is shown on the drawing 10 in two positions so that his design would be more clear. The drawing 11 shows three views on the sabre shape toothpick. The drawing 12 shows already mentioned screw, serving as a support, while the drawing 13 shows the protection for hairy part of the brush in two projections.

The tooth-brush with container for tooth-paste and system for squeezing out tooth-paste placed in the holder, consists of small number of elements which meet the already mentioned requirements: unification of functions of the tooth-brush and the tooth-paste container, simplicity and successfulness of the application, and certain hygienic requirements in this connection. The basic part and the carrier of the other parts is the body of the brush itself (1), drawing 2. The body itself has the multiple function: it is the tooth-paste container, it provides delivery of tooth-paste on the one-way valve and is the carrier of the hairy part (9) which function is the same as that of the classical tooth-brush. In its crosscut the body is round with flattened piston guides, drawing 2, crosscut B-B.

In the body (1) under hairy part (9), the drawing 2, there is one-way valve derived from laminated spring (drawing 8) and the leaning cover (drawing 7). The laminated spring in form of stylised figure 8 with spring up mechanism in the very centre and slightly bent in order to resist from being drawn downward, detail D, crosscut D-D, drawing 2. The leaning cover of the one-way valve (drawing 7) is inserted in the laminated spring in the way that by its neck it jumps in its centre thus being caught for its "upper head", while its lower, but larger part, leans on the channel opening through which the tooth-paste is passing. The function of one-way valve is double: first of all, when the sufficient pressure is obtained in the channel, the tooth-paste begins coming out (the resistance of the laminated spring is surmounted), and when the outside air pressure and the inside pressure of the tooth paste are equalised, it is prevented, during tooth brushing, the penetration of water and later on the air in the tooth-paste container, thus preventing the paste degradation like oxidation, dehydration etc.

Besides, the protection for the hairy part (10) is put on the body itself, drawing 2, in the way shown in details D and F. The protection is meant to protect the hairy part from damaging and contamination with impurities.

The pressure in the body itself (1), drawing 2, is obtained by manual turning of the activation button, shown on the drawing 2, detail and view A. By turning of the button, drawing 5, which is in fact merged into the inner piston guide, drawing 9, the move of the piston, in the very space of the body is obtained, the volume of tooth-paste is being diminished and consequently the pressure is generated which causes the opening of one-way valve. In order to permit better sliding, a sliding ring (drawing 6) is mounted between the body and the activation button in the way that it is placed on the part of button which enters the body as shown on the drawing 2, detail A. The connection between the activation button (2) and the piston guide (4) is effected in the way shown on the drawing 2, detail E, where one can see the standard way of leaning by jumping in (2) to the end of (4). In this way (2) and (4) (see detail A and E, drawing 2) become united as if they have been made of one single piece. In the procedure of assemblage, the sliding ring (5) is put in, which, beside its aesthetic component, is meant to diminish friction between activation button (2) and the body itself (1). On the other side, the guide (4) is mounted (springy) on the classical screw (11) which is situated in the body (1), reinforced by rib (12) having the role of carrier, drawing 2, crosscut C-C, detail C.

In order to permit the undisturbed work of the invention itself as well as to enable the efficient filling of the ready made product, the construction of piston is of extreme importance. The piston is in its construction modified circle, drawing 10, with lateral smoothness, concentric opening - coil for acceptance of the coil of the piston guide. Beside the mentioned opening, the piston has another opening through which is effected the filling procedure, which can be seen on the lateral projection of the drawing 10. The sealing is to be effected in the way that there would be no loss of tooth-paste pressure so that the power from the activation button be, by means of piston, transferred to the tooth-paste, and by mediation of tooth-paste to the laminated spring of the one-way valve. The lateral smoothness prevent the rotation of piston in the space of the body and carry it down the coil of the guide. This is extremely important in order to assure the liability of the work of invention, i.e. that every turn of the activation button may perform the proportional change of pressure in the container, in order to avoid possible idle run.

It has been already mentioned that the construction itself permits the easy assemblage of the complete tooth-brush, as well as an easy way of its tooth-paste filling. The tooth-brush is assembled in the way that the parts (7), (8), (9) and (10), drawing 2, are mounted on the body (1) in the already mentioned way. The screw (11) is laid into the body and thus the preparation of one part of the body is completed. The following step is the mounting of piston guide (4) with piston (3) by putting them almost at the end of the guide itself, approximately 1 do 1,5 turns up to the so called "upper point" of the maximum capacity of the tooth-paste container. Than the guide (4) is springy connected to the screw (11).

The piston itself has a specially designed part (13), which is in fact the small tube of the corresponding diameter through which the nozzle can be introduced, which length can be almost as the length of the body itself (1). By means of the specially designed installation, which is not the subject of invention, such nozzle can be introduced through (13) starting the injection of the tooth-paste from the head of the brush to the beginning, retreating by constant speed. During this time the piston is on the opposite end, at the position of the "upper point", while the complete body is vibrating so that the entering paste could evenly take the volume of the body, thus squeezing out the residual air. When the nozzle leaves the space of the container defined by the piston position, the very end (13) is closed by special tool, by melting, gluing or similar procedure, depending on material the piston is made of (13).

After that the container is filled with tooth-paste and it is to be started the assemblage of the activation button (2) and sliding ring (5) on the already mentioned way - by springing in (2) to (4) as shown on details E and A, drawing 2. The activation button is additionally turned for 1 to 1,5 turns up to the very end, which insures the vacuum in the container, providing better sealing of the one-way valve leaning cover.(8).

No less important is the sabre shape toothpick, shown on drawing 11. Its shape, the sabre shape, permits the liable emplacement inside the activation button and piston guide, as shown on detail A and crosscut B-B, drawing 2, and this in the way that by friction it is fixed inside the guide itself, while its head is sticking out from inside the button. In this way it is easily taken out and after use it is easily put on its place again. The activation button has grooves which improve the finger contacts (especially wet ones) and button when being turned.

## CLAIMS

1) The tooth-brush with container for tooth-paste and system for squeezing out tooth-paste contained in the tooth-brush holder with minimum number of parts which are all mounted on or in the body, as shown on the drawing 4 **characterized by** the other parts are inside piston guide (drawing 9) with activation button (drawing 5), sliding ring (drawing 6), leaning one-way valve cover (drawing 7), laminated spring (drawing 8), piston (drawing 10), toothpick (drawing 11), screw (drawing 12) and protection of the hairy part (drawing 13).

2) The tooth-brush with tooth-paste container against requirement 1 **characterized by** has one-way valve which is formed by leaning cover with two heads as shown on the drawing 7 and laminated spring, as shown on the drawing 8, in the way that the cover is fixed in the center of the laminated spring and both are placed into the head of the brush, under its hairy part.

3) One-way valve according to requirement 2 **characterized by** it permits only the exit of the tooth-paste from the container into the hairy part of the brush head, and prevents the entry of water or air during and/or after use, into the tooth-paste container.

4) The tooth-brush with tooth-paste container according to requirement 1 **characterized by** the emptying of the container is realised by turning of the activation button, and consequently the piston guide, which result is the pushing of piston and transmission of pressure by means of tooth-paste to the laminated spring opened by one-way valve.

5) The inside guide on which the activation button is leaning as the component part of the tooth-brush with container, from requirement 1, **characterized by** has a coil on its length, that it is fixed in the body by means of spring in holder which leans on the screw (drawing 2, detail C), and that there is a toothpick container (drawing 2, pos. (6).

6) The piston, as the component part of the tooth-brush with container from the requirement 1, **characterized by** it has lateral smoothness (drawing 2) which prevents its rotation and a bore of arbitrary shape (drawing 2, pos. 13) which is used to fill the container with tooth-paste.

7) The way of filling the tooth-brush container **characterized by** the filling is performed by piston placed almost at the farthest opposite position with regard to the tooth-brush head, where:

- a) by specially designed installation, which is not the subject of our invention, the nozzle of that installation is introduced through space on the piston (drawing 2, pos. 13) and the injection of the tooth-paste begins from the head of brush to the beginning, retreating by constant speed, filling thus the piston defined by piston position and the head of the brush;
- b) During that time the piston, being on its position, is permanently vibrating so that the entering paste could evenly take the volume of the body, thus squeezing out the residual air.



- c) When the nozzle leaves the space of the container defined by position of the piston, the end (13) is closed by special tool, by melting, gluing or similar procedure, depending on material the piston is made of (13);
- d) The activation button and the sliding ring are mounted on the piston guide. The activation button is additionally turned for 1 to 1,5 turns up to the very end, which ensures the vacuum in the container, providing better sealing of the one-way valve leaning cover (drawing 2, position 8).

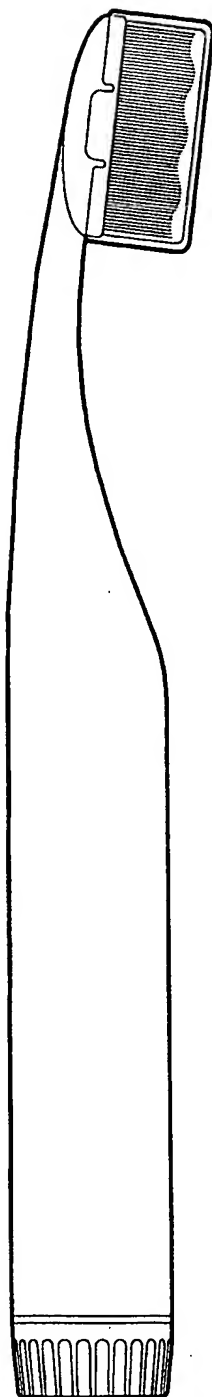


FIG. 1

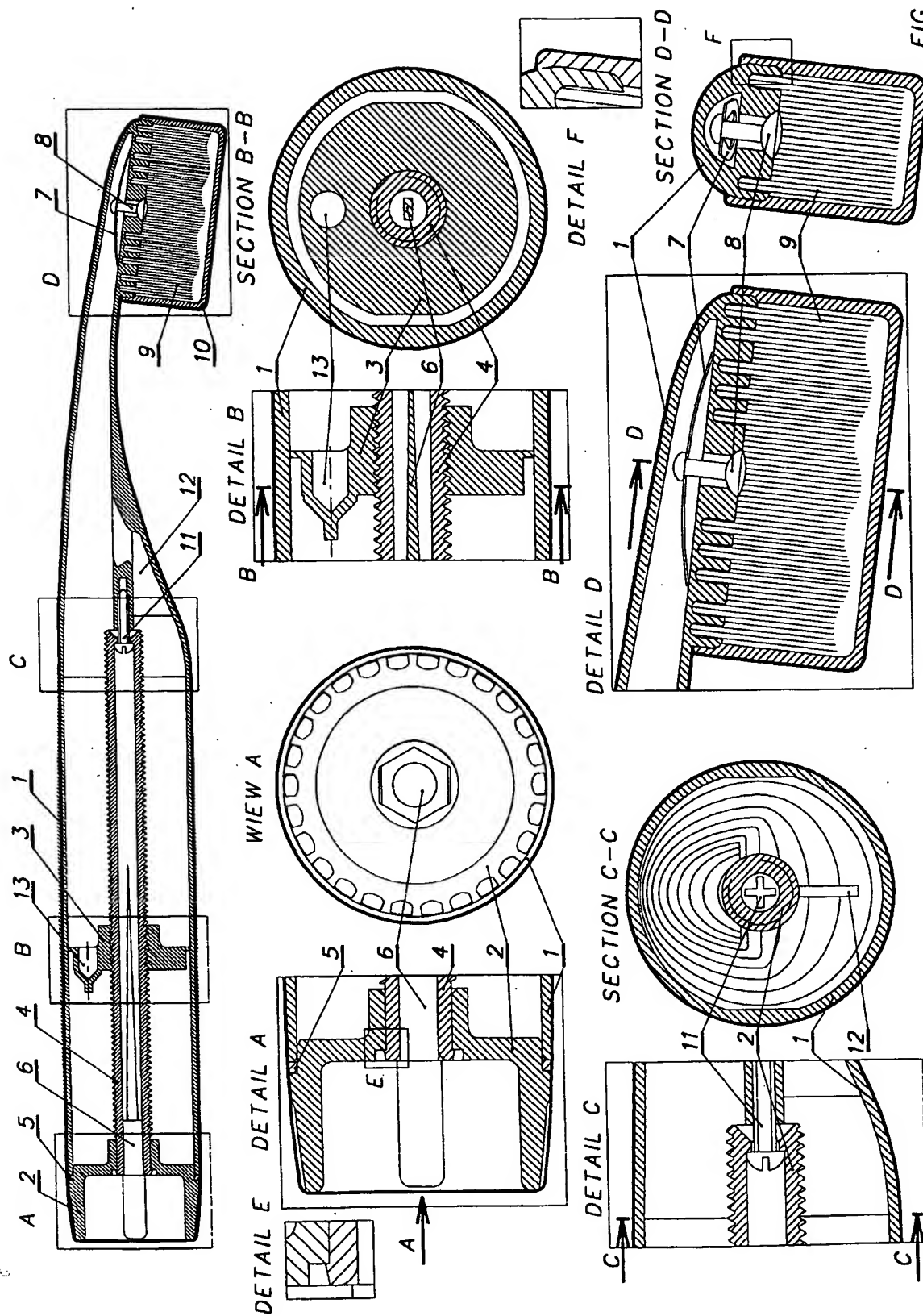
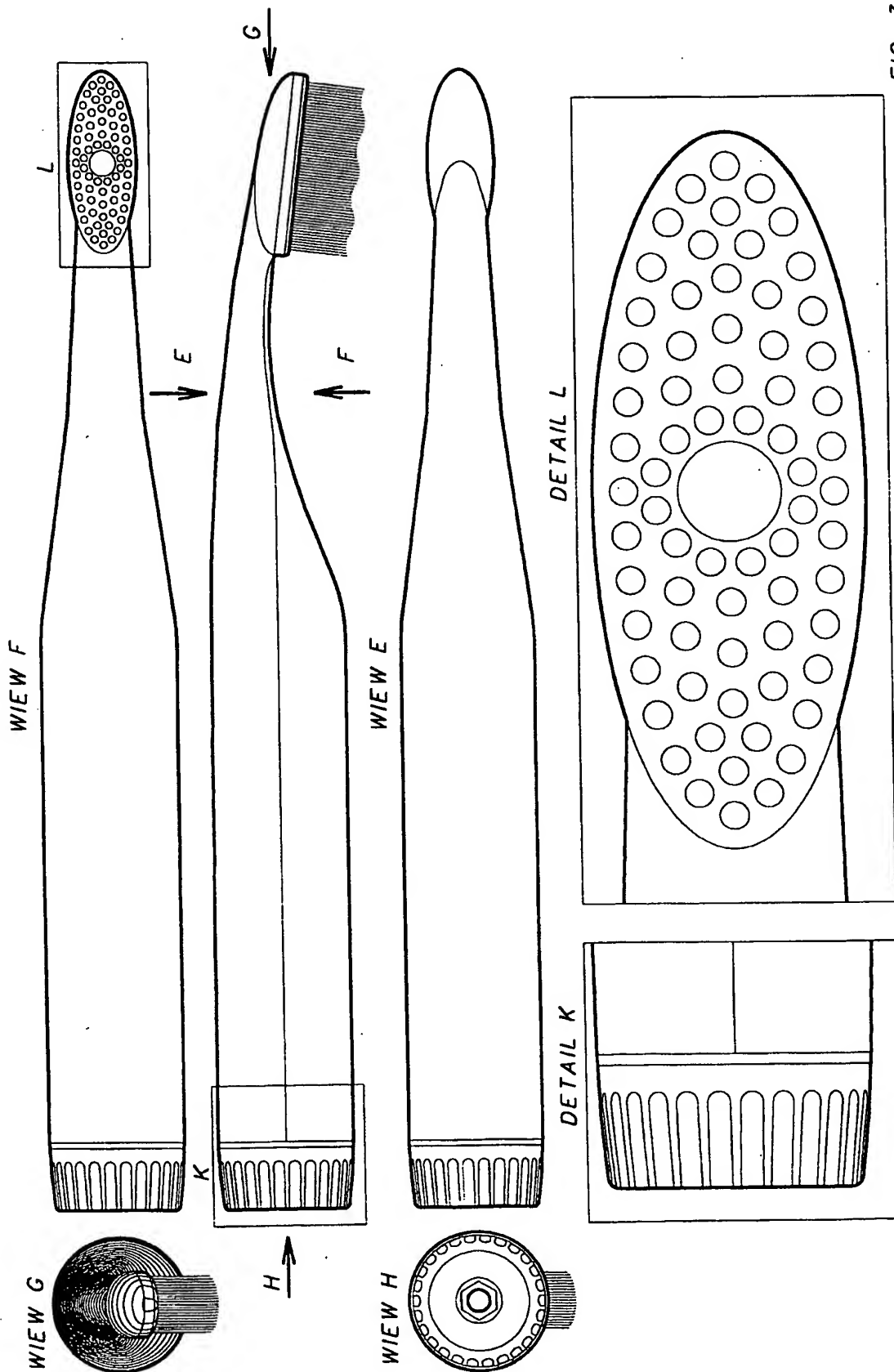


FIG. 2



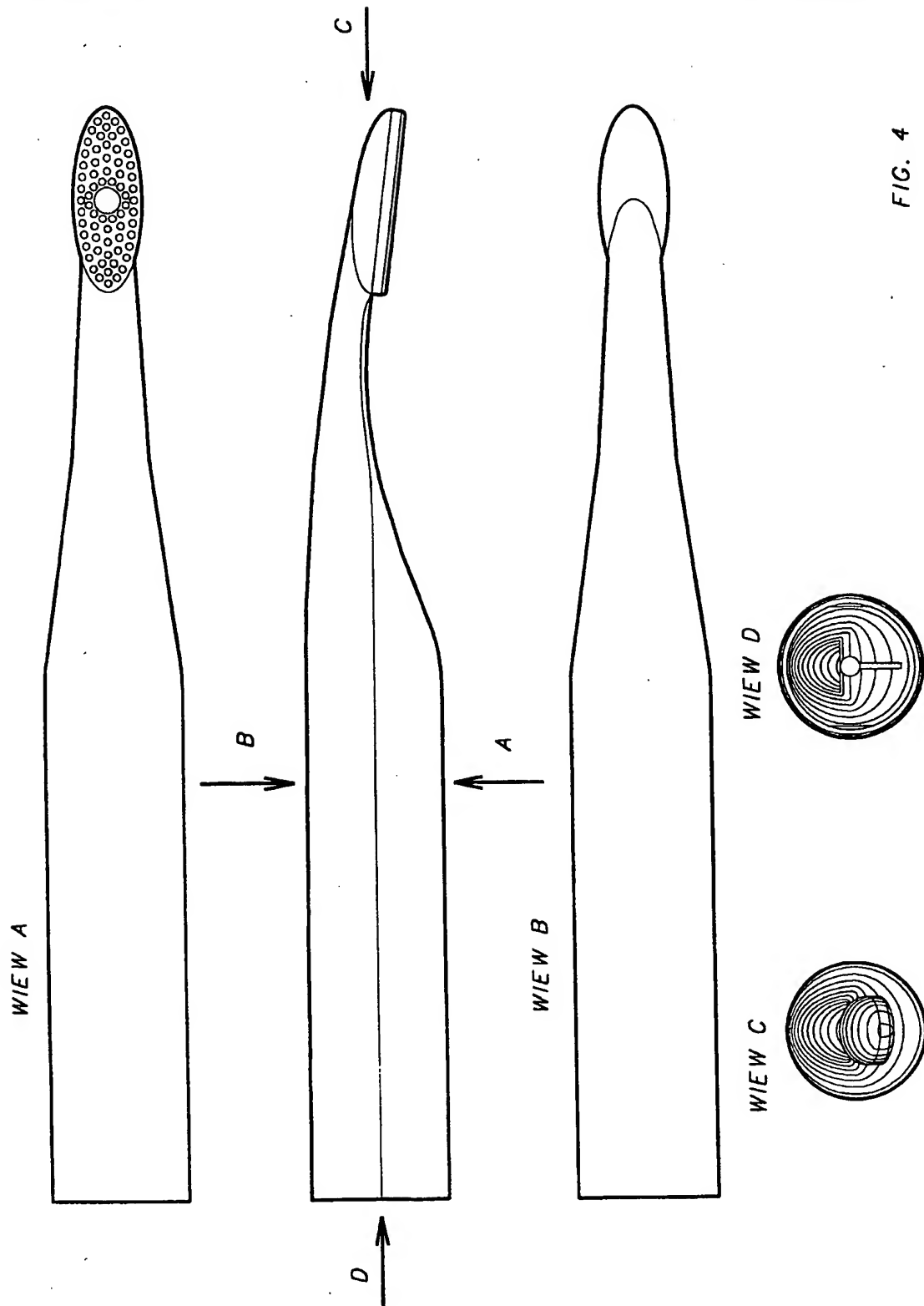


FIG. 9

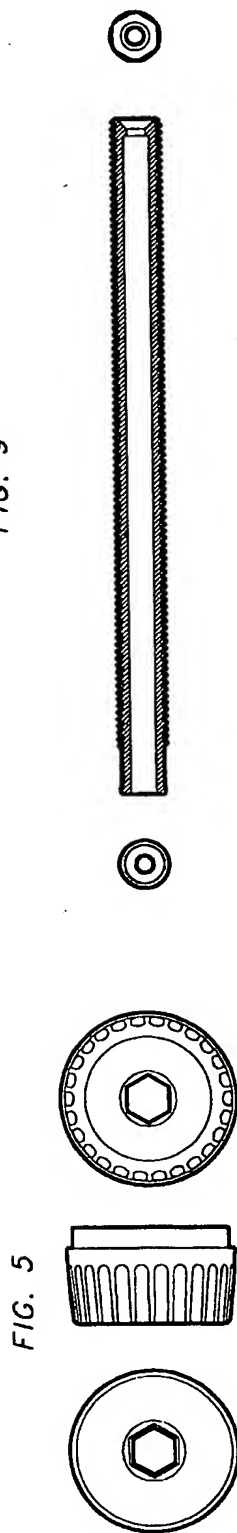


FIG. 10

FIG. 6

FIG. 8

FIG. 7

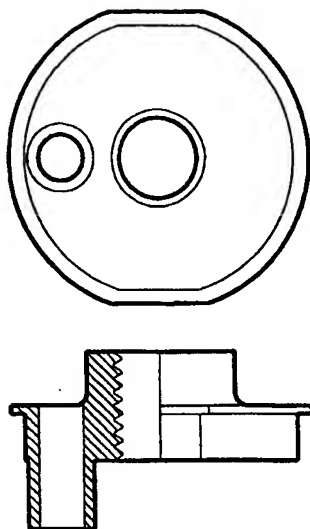


FIG. 12



FIG. 13

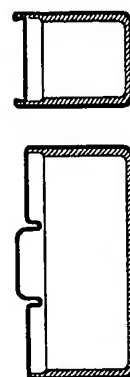
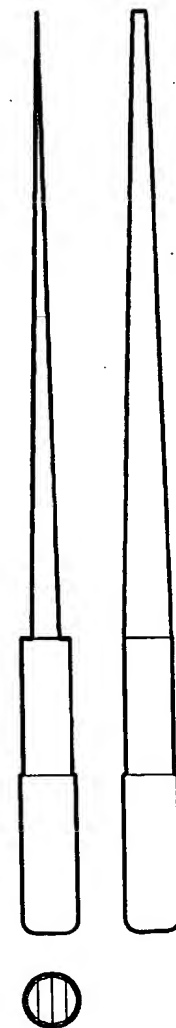


FIG. 11



# INTERNATIONAL SEARCH REPORT

In :tional Application No

PCT/HR 98/00003

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 A46B11/00 A46B17/04 A46B15/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A46B B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 122 983 A (JOLLY) 31 October 1978 see column 5, line 63 - column 17, line 50; figures	1-7
A	EP 0 161 907 A (ALPHAPLAN LTD) 21 November 1985 see page 3, line 12 - page 7, line 19; figures	1-6
A	EP 0 285 121 A (BARNO) 5 October 1988 see column 2, line 30 - column 4, line 25; figures	1
A	DE 44 31 469 A (DRZAIC) 28 September 1995 see column 2, line 11 - column 3, line 42; figures	1

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Date of the actual completion of the international search

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
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